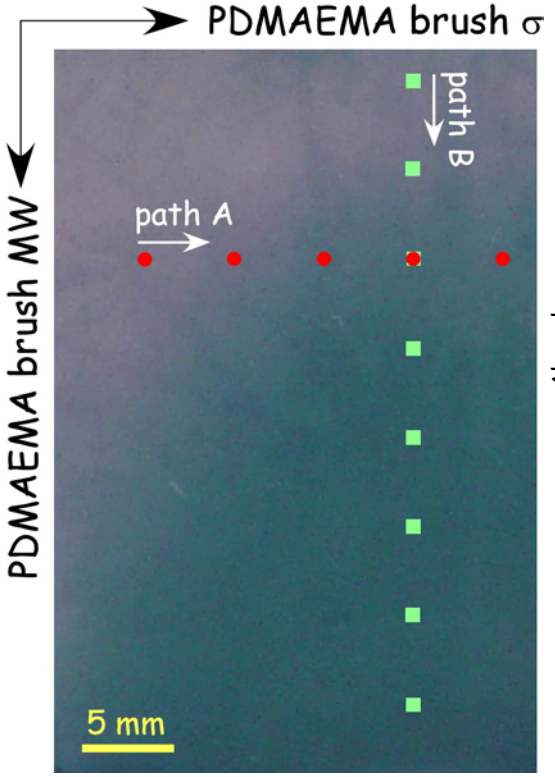
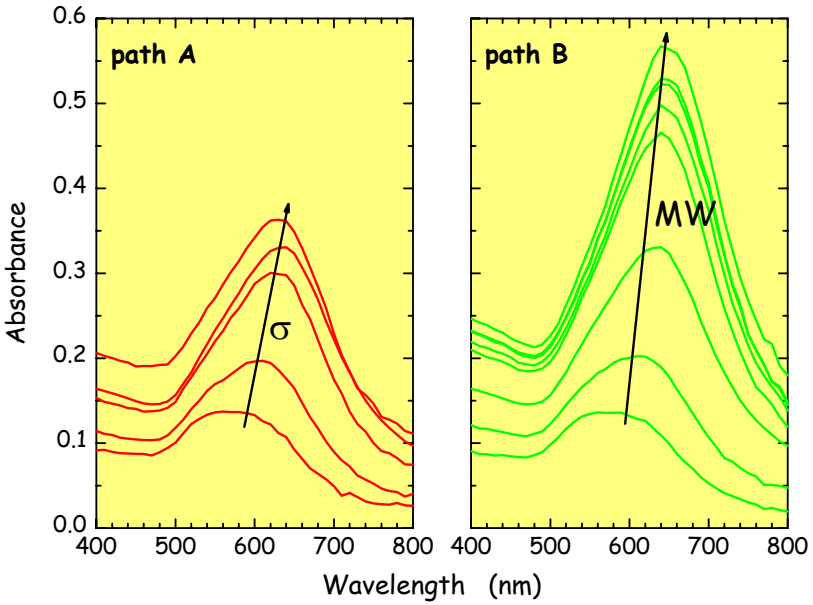
Fabrication of nanoparticle assemblies in ordered polymeric matrices
(Grant No.: DMR-9875256, Program director: Dr. Andrew J. Lovinger)



# Formation and properties of nanoparticle gradients

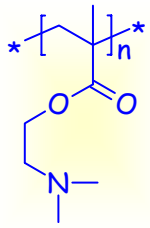


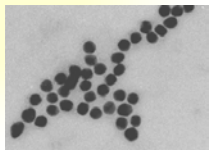

(far left)
Photograph of orthogonal PDMAEMA gradient with adsorbed gold nanoparticles; the particle concentration varies gradual across the substrate, following the polymer template

(left)
UV-Vis spectra taken from PDMAEMA/Au nanoparticle samples along a constant MW (path 1) and constant σ (path 2) directions. The UV-Vis intensity increases with increasing MW and σ.

Poly(dimethyl aminoethyl methacrylate)
(PDMAEMA)




Au particles (16 nm)



## Results:

Substrates comprising polymer brushes of poly(dimethyl aminoethyl methacrylate) PDMAEMA generated; brush grafting density (σ) and molecular weight (MW) vary in two orthogonal directions;

Citrate-covered gold nanoparticles assembled on top of the PDMAEMA substrate;

Distribution of the Au particles on follows the PDMAEMA template (increases with increasing MW and σ).

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# Outreach activities

## Student awards:

Raising junior in the PI's lab, Mr. David Erel, has been selected as one of 40 recipients of the MRS 2002 UMRI student award winners.

David has also been selected as one of 6 NCSU undergraduates who presented their research to the NC Legislators in early fall 2002

## Educational outreach:

The PI has participated in mentoring high school students and incoming freshmen from the RISE ("Reaching Incoming Students Enrichment") Program at NC State University. A three week research experience for incoming freshmen at NC State, the RISE Program is a competitive curriculum involving multiple Park, Jefferson, and Caldwell Scholars. During summer 2003 summer, Ms Ashley Forte, an African-American student from Durham, NC, has been working in the PIs lab.

The PI has recently become involved in the Kenan Fellows for Curriculum and Leadership development Program at NC State University, an innovative partnership between the Kenan Institute for Engineering, Technology and Science at NC State University, Wake County Education Partnership and several universities and school systems.

Kenan Fellows
CURRICULUM AND LEADERSHIP DEVELOPMENT

The Kenan Fellows for Curriculum and Leadership development Program aims at promoting teacher leadership, address teacher retention, and advance K-12 science, technology and mathematics education.

KENAN INSTITUTE ENGINEERING, TECHNOLOGY & SCIENCE

The PI has recently been selected among several faculty member candidates at NC State University to act as a faculty advisor to a high school teacher, selected from a large group of candidates, who will participate in this program.